



# Making Good Use of Small Spaces

TREE CITY USA®  
BULLETIN

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Editor: Dr. James R. Fazio • \$3.00



***A**s open space in our communities becomes crowded with buildings, roads, and parking lots, the need to wisely use even the smallest of spaces grows more critical. Now is the time for innovation and vision to ensure that there will always be room for trees, flowers, and wild creatures and places to play, relax, or meditate. It is also the time for innovation to help us make good use of all areas to conserve water, save energy, and live sustainably.*

When Mark Twain advised, “Buy land — they’re not making it anymore,” he had no idea how those words would be magnified in the 21<sup>st</sup> century. As the 1900s drew to a close, cities were spreading over the rural landscape at a rate of 2.2 million acres per year. The spread, of course, was and is fueled by more and more people. The world’s population doubled in less than 50 years, and in the United States, it went from 76 million people in 1900 to 281 million in 2000. In addition, the demand for natural resources per capita is rising, and as Mark Twain warned, space for all of this has remained the same.

Urban foresters and concerned citizens in many parts of the country are rising to the challenge of ensuring that trees

Green roofs that convert building tops into environment-enhancing gardens are among the ways communities are making good use of small spaces.

and other natural components of our environment will not be crowded out of existence. Some have been planning this for a long time. For example, thanks to urban planning that began more than 100 years ago, Cook County, Illinois, has a system of protected land exceeding 68,000 acres, including 3,688 acres within the city limits of Chicago. These precious areas include a 90-acre prairie preserve so rich in natural diversity that if you tossed a hula hoop on the ground, it would encompass more than a dozen native plants. The areas decrease in size to the footprints of former buildings, which are now little parks, to narrow highway medians where colorful, durable varieties of plants soften the harsh landscape.

Officials in many other cities are becoming aware of the need to address the challenges of growing demands on a static land base. How this is done is limited only by imagination, leadership, and the will of the people. However, getting it done is essential to preserving the beauty and health of our communities.



**Arbor Day Foundation**  
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# Parks and Other Open Spaces

*City officials, private nonprofits, and local residents across the country are doing whatever they can to provide small parks, public gardens, and other small spaces to benefit local residents. Here are some successful examples.*

## NEW YORK'S HIGH LINE

For 25 years, a section of New York City's elevated rail tracks stood idle, a remnant of the era when freight trains were the lifeline of factories and meatpacking plants in the area. Beneath the tracks, the land is a hodgepodge of parcels in private and governmental ownership. When the structure was threatened with demolition in 1999, New Yorkers came together to form a community-based nonprofit, Friends of the High Line. Thanks to vision, private donations, and the cooperation of the mayor's office and Department of Parks and Recreation, 1.45 miles of tracks 30 feet above land was transformed into a public walking park and saved from destruction. Volunteers help with the maintenance, and thousands of New Yorkers benefit from this linear oasis on the west side of Manhattan.

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Volunteers and city crews removed rails and converted an elevated train track into a landscaped linear park. The design follows green roof principles, retaining up to 80 percent of rainwater for use by more than 350 species.

## INDIANAPOLIS TRANSFORMS UNLOVED PLACES INTO COMMUNITY ASSETS

Every city has its vacant lots, odd parcels of unused land, and other sites that invite litter, illegal dumping, or worse. The nonprofit organization Keep Indianapolis Beautiful Inc. has made it a goal to convert such unlovely and often dangerous places into little patches of beauty that serve local residents and build community pride.

Much of the focus in Indianapolis is on pocket parks, defined as areas under one-fourth of an acre in size. Street plantings, recycling projects, and educational events are part of the activities that accompany the creation and maintenance of the sites. Each year since its inception in 1976 (then called Indianapolis Clean City), Keep Indianapolis Beautiful has supported an average of 500 community improvement projects with the help of tens of thousands of volunteers. More than 40,000 trees have been planted, and miles of median strips have been adopted by residents. The organization works in partnership with the city and offers grants on a competitive basis. When a grant is awarded, Keep Indianapolis Beautiful provides the plant material, tools, and project expertise; the applicant provides the volunteers to do the work.





## THE ELABORATE AND THE SIMPLE

Preserving open space or creating a place of beauty among the built environment can be done in any community regardless of the size of the space available or property ownership.



Greenacre Park is a plot of land about 60 feet wide and 120 feet deep containing a 25-foot-high waterfall that lends a peaceful sound to the chaotic noise of midtown Manhattan. Owned by the Greenacre Foundation, the little park is a philanthropic project to honor Laurance Rockefeller. The multi-level site includes an overlook, seating, and a place to enjoy food.



Drake Garden is a vacant lot in Chicago that was transformed by the Drake Garden Volunteers into a place where neighbors gather and get their hands dirty working with plants and soil. The site is divided into spaces for trees, shrubs, flowers, and open space. Support and ownership is created by using the site for occasional block parties and rummage sales. The nonprofit organization NeighborSpace helped acquire legal ownership of the property.

## SPACES FOR WORKING AND LIVING

Social scientists have confirmed what most people already knew — a workplace with trees and a little space contributes significantly to employee satisfaction. Whether it is a shaded picnic table or a leafy streetside café, even the smallest connection with nature can help busy people relax. Numerous research studies have also shown the positive effects of interactions with nature in settings such as hospitals and schools. In the public forum, the use of small spaces becomes an issue of not only aesthetics but public health.

A groundskeeper for Good Samaritan Village in Moscow, Idaho, leads a tour of Garden Club members around the grounds of the retirement facility. Smooth paths, benches for seating, and an abundance of trees and flower beds make life more pleasant and healthful for residents who choose this as their home.



## AN URBAN FORESTER SAVES TIME AND MONEY

When a new restaurant in Boise, Idaho, submitted its development plan to the city, one of the reviewers required was the city forester. The proposed establishment included a narrow stretch of greenery around the store and screening around the parking lot, including a number of trees. Unfortunately, the landscape architecture firm that

was hired for the job had its offices in a city more than 1,000 miles away. The local forester immediately spotted tree species he knew would not survive the city's soil and climate conditions. The plan was changed, and today the restaurant blends nicely into the neighborhood with its green surroundings.

# The World of Green Roofs

*Green roofs in America are the revival and modernization of ancient technology. For centuries in mountainous Europe, animals grazed on sod roofs that at the same time protected and insulated homes and barns. Today, once-wasted spaces of all sizes and shapes on our city buildings are being put to a new use that benefits everyone.*

## WHY CONSIDER A GREEN ROOF?

Green roofs, or ecoroofs, replace conventional roofing with a living complex of plants. Building with or converting to a green roof:

- Saves energy through summer and winter insulation.
- Significantly decreases the volume of stormwater runoff.
- Reduces water pollution.
- Helps clean the air by filtering out pollutants and adding oxygen.
- Helps fight climate change by absorbing carbon dioxide.
- Cools the air, reducing the heat island effect of cities.
- Provides habitat for birds and insects, such as butterflies.
- Adds urban open space for people to enjoy.

## THE ESSENTIAL COMPONENTS

The illustration below shows the basics of what is needed to have a green roof. Some designs add other elements, such as supplemental insulation. There are many sources of technical assistance, some of which can be found at [arborday.org/bulletins](http://arborday.org/bulletins). In Europe, green roof products and services are a multimillion dollar business, and the United States is rapidly catching up. Green roofs are proving to provide owners with good returns on their investments, and they contribute to LEED (Leadership in Energy and Environmental Design) certification by the U.S. Green Building Council.

Green roofs can be flat or sloped and residential or commercial. If the structural ability of a building can sustain the weight of a green roof, there are few other barriers to turning the roof into a useful and pleasant part of the property.

## GREEN ROOF BASICS

**VEGETATION.** This will vary by local conditions, but the goal is to select plants that require minimal maintenance. Native grasses and drought-resistant shrubs and perennials, such as sedums, ferns, asters, and wild petunias, are often used. See [arborday.org/bulletins](http://arborday.org/bulletins) for links to a complete listing of recommended plants.

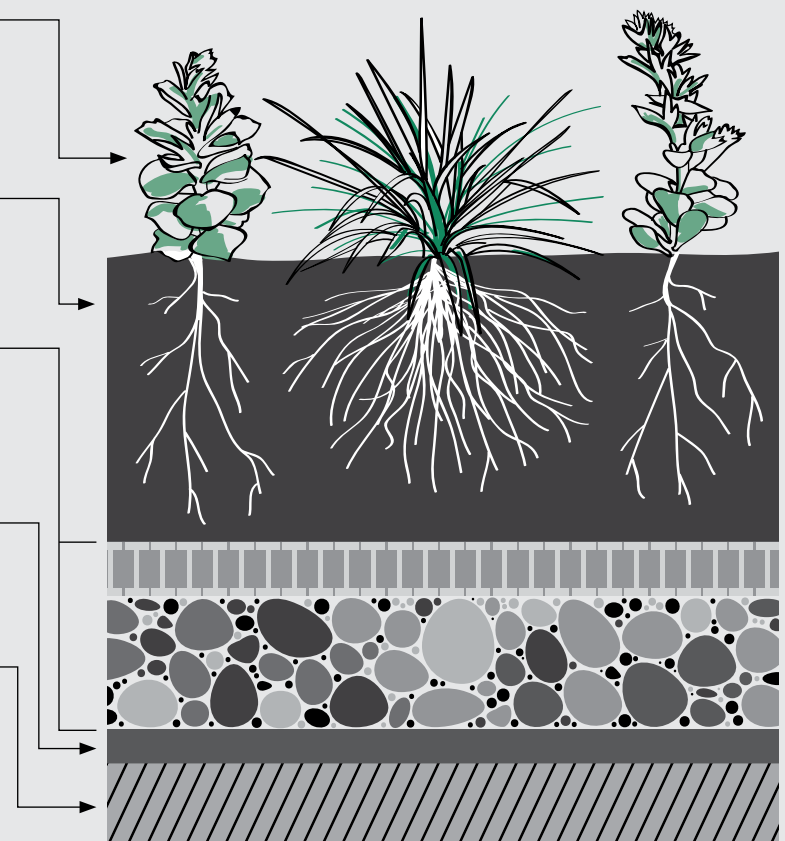
**GROWING MEDIUM.** Usually a layer about 2-6 inches deep, consisting of soil engineered to enhance water-holding and aeration attributes. On sloping roofs, baffles are necessary to help hold the soil in place. Pre-grown modules in large, interlocking trays are also available.

**FILTER MEMBRANE AND DRAINAGE LAYER.** These may not be needed on sloping roofs. On a flat roof, the drainage material may be a thin layer of gravel topped with a membrane, such as perforated plastic. The membrane's role is simply to separate the soil from the drainage material.

**WATERPROOF LAYER.** This important material keeps water out of the building. It is made of asphalt, synthetic rubber, or other materials. Depending on the manufacturer, a root barrier may or may not also be needed.

**STRUCTURAL SUPPORT.** Whether concrete, wood, steel, or other material, the basic roof must be engineered adequately to support the added weight of 10 to 25 pounds per square foot when the material is wet.

**NOTE:** Irrigation will usually be needed until the plants are established. This can range from hand-watering to various irrigation systems.





## A WIDE RANGE OF POSSIBILITIES

Green roofs can be designed to fit all circumstances. Some are accessible for use by residents or visitors. Ecoroofs are designed especially to be lightweight, use shallow soil, and be low maintenance and self-sustaining. All make good use of small spaces and make a contribution to better living in urban environments.



The Church of Jesus Christ of Latter-day Saints Conference Center roof and terraces in downtown Salt Lake City, Utah, provide environmental benefits as well as a showcase for visitors. Diverse vegetation was planted on top

of lightweight concrete in 12-18 inches of Utelite E-Soil. Fields on this green roof contain 21 native grasses and 300 varieties of wildflowers. Hundreds of bristlecone pines, spruces, and aspens complete the landscape.

Residents of Louisa Apartment Building enjoy a garden-like environment thanks to their green roof, which contributes to cleaner air, stormwater control, and other environmental benefits. Portland, Oregon, is a leader in the art and science of green roof technology. More than 300 green roofs have been constructed in Portland, many with technical assistance and financial incentives from the city. The city's Bureau of Environmental Services oversees the program and promotes green technology through publications, workshops, and aggressive publicity.



## GREEN WALLS

A wide variety of green, or living, walls are rising up in our cities. These include traditional vine-covered walls or trellises with the plants rooted in the ground; shelf-like, wall-mounted modules containing a growth medium (thus, not against the building, and with the potential for many varieties of plants in different containers); and free-standing walls with layers or trays containing plants.

These vertical spaces soften urban landscapes, reduce noise and glare, and in some cases, slow the runoff of rainwater and help conserve this precious commodity through re-use. Some green walls are even used to grow small garden crops. They are particularly important in reducing the heat effect of the summer sun in cities. The buildup of heat is due primarily to insolation, or the absorption of solar radiation by the materials used in buildings, parking lots, and other manufactured surfaces. The stored heat is re-radiated, adding to uncomfortably high temperatures and their relationship to air pollution. Instead, plant surfaces tend to cool the air.

The free-standing green wall at the Hawthorne Hostel in Portland, Oregon, is constructed in layers and watered from a drain pipe off the adjoining building. The rainwater is recycled into a cistern and then back to the building for use in toilets. This wall provides privacy, a sound barrier, and a place for public art.





# Little Spaces Can Conserve Lots of Water

*Feast or famine can often sum up the presence of rainwater. When storms strike, water rushes across streets and parking lots, challenging the capacity of drain facilities and carrying accumulated oil, pesticides, metal particles, and other pollutants into natural waterways. At other times of the year, water becomes scarce and sometimes expensive. Here are some ways small spaces can be used to address both problems.*

## VEGETATED SWALES

Swales, sunken planters, and catch basins slow runoff and filter out solids and chemicals. When trees and other vegetation are added, the job is done even more effectively. Traffic is calmed, and the aesthetics of busy streets, parking lots, and housing areas is enhanced. An added benefit is that retained water makes soil moisture available to tree roots for a longer time.

Streetside swales can be built into new developments and curb bump-outs can be added to existing streets, as shown here. Note the curb cuts to allow water to flow into the swales instead of sewer grates.



## TREES

Every tree contributes to slowing stormwater runoff. A single mature tree with a 30-foot crown spread can intercept 700 gallons of rainfall annually. Studies have shown that when natural landscaping is used as part of a residential development, 65 percent of storm runoff can be reduced, 80 percent of suspended solids and heavy metals can be filtered, and up to 70 percent of nutrients, such as phosphorous and nitrogen, can be kept out of waterways and fish habitat.

## FLOW-THROUGH PLANTERS

The benefits of flow-through planters are similar to swales, but the water flows through the soil and a layer of gravel before being piped from the bottom to a gutter, swale, or catch basin. These can be fitted into tight spaces, such as between a building and the sidewalk or a house and the lawn or patio. They can be above or below ground level.

Flow-through planters are especially suited to tight urban spaces and can be above or below ground.







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## HOW A CITY FORESTER CAN HELP

City foresters are good people to ask for advice about ways to use small spaces. They can provide information such as:

- Permits that might be required for the kind of modifications suggested in this bulletin.
- The best species or cultivars of trees to plant in the space and soil available.
- Locations in town where you might observe the practice or facility you have in mind.

- Units of city or state government that should be involved in your project.
- Grant or incentive programs that may be available to help with expenses.
- Workshops or other sources of information that may be of help.
- How your project might help contribute to a Tree City USA Growth Award for the city or a Certified Wildlife Habitat Award from the National Wildlife Federation.



## RAIN BARRELS

Rain barrels and larger tanks called cisterns are a return of old technology in areas where drought is becoming more common. Barrels range in size from 55 to 90 gallons and can be used to store water for the garden or other non-potable uses.

◀ Necessity was the mother of invention at Bartlett Tree Experts' Raleigh, North Carolina, facility. When drought forced the city to stop supplying water, the company drilled its own well but supplemented it with this custom-made rainwater storage system. Savings from the new cistern method are expected to pay for the investment in just six years.

Commercially available barrels to store rain come in many shapes and sizes. An overflow pipe allows for drainage of excess water, but the barrel retains 55 to 90 gallons. This can be used for watering plants, washing the car, and other uses that conserve tap or well water. ▼



# Finding Space for Children

The parcels of woods and old fields that were used by many of us in our youth are no longer available to children or safe for outdoor play. Nature Explore Classrooms are part of a program sponsored by the Arbor Day Foundation and Dimensions Educational Research Foundation intended to provide many of the same kinds of hands-on interactions with nature that we enjoyed in our childhood.

These special classrooms are based on field-tested principles and include 10 recommended areas. The areas provide fun opportunities and include all learning styles so that the classroom contributes to the development of motor skills, imagination, observation, cooperation, and others. The 10 areas, each serving its specific research-based purpose, are an entry feature, open area, climbing/crawling site, building area, messy materials area, nature art area, place for music and movement, garden or pathway through plantings, gathering place, and storage facility. Supplemental areas are suggested where space and local interest allow.

One of the great features of Nature Explore Classrooms is that they can be designed to fit any space or circumstance. A model classroom at Arbor Day Farm is only 3,400 square



feet. Other small classrooms are located at child care centers, urban schools, and small parks. A Nature Explore Classroom is an excellent use of a small space to help young children discover the joy of outdoor play, the wonders of nature, and skills that lead to success in school and later in life. You can see many examples of different Certified Nature Explore Classrooms at [natureexplore.org](http://natureexplore.org).

## FOR MORE INFORMATION ...

For helpful sources of information about Nature Explore or any other topic in this bulletin, please visit [arborday.org/bulletins](http://arborday.org/bulletins).

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